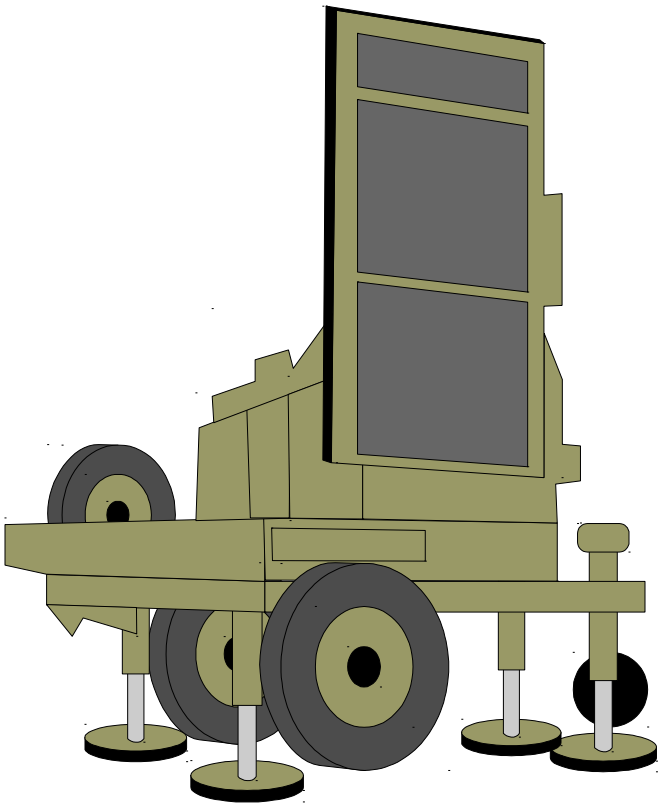
FIREFINDER RADARS AND COUNTERFIRE AN OVERVIEW

Topics to be Covered

- Basic Capabilities of the AN/TPQ-36 and AN/TPQ-37 Firefinder Radars
- Effective use of Firefinder Radar Systems
  - *Radar Technical Parameters*
  - *Target Management*
- Radar Zones and the Common Sensor Boundary (CSB)
- False and unwanted Targets
- Counterfire Planning and Execution

AN/TPQ-36

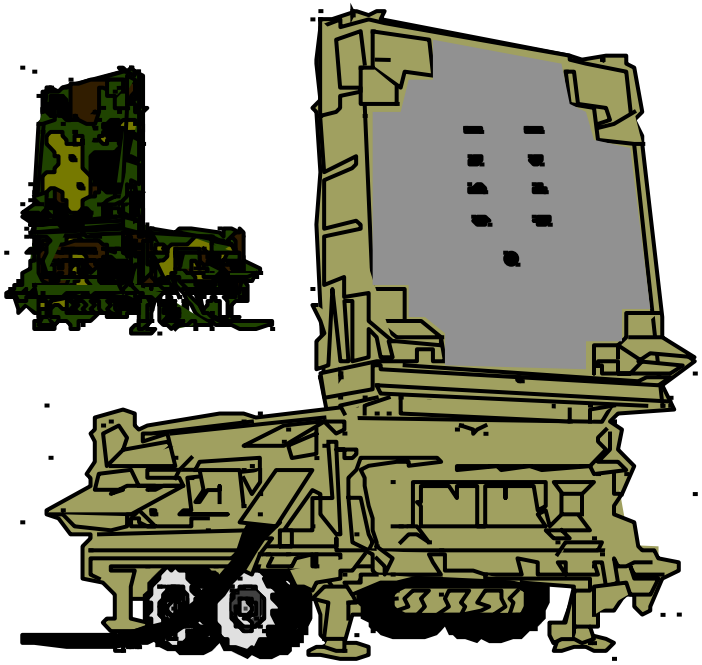
The mission of the AN/TPQ-36 is to locate high angle indirect fi
weapons such as mortars. It can be used to locate cannon artillery and ro



Prime Mover:	**HMMWV (M1098)**
Planning Ranges:	
Artillery & Mortars:	**18,000 meters**
Rockets:	**24,000 meters**
Azimuth Search Sector	**1,600 mils (6,400 in ext azimuth mode)**
Accuracy	**100 meters CEP**
Traverse	**6,400 mils**
Elevation	**15 to 30 mils screening**
Emplacement Time	**20 minutes**
Displacement Time	**10 minutes**
Fording Capability	**16 inches**
Air Transport	
Internal	**C130, C141**
External	**CH-47D, UH-60**
Type of Targets	**Mortars, Artillery, Rocke**
Distance from FLOT	**3 to 6 kilometers**
Weight	
Trailer	**4,440 pounds**
Shelter	**2,780 pounds**
W/Prime Mover	**19,640 lbs.**
Length	**170.75 in**

AN/TPQ-37

The primary mission of the AN/TPQ-37 is to locate low-trajectory indirec weapons such as rockets and artillery. It can be used to locate mortar

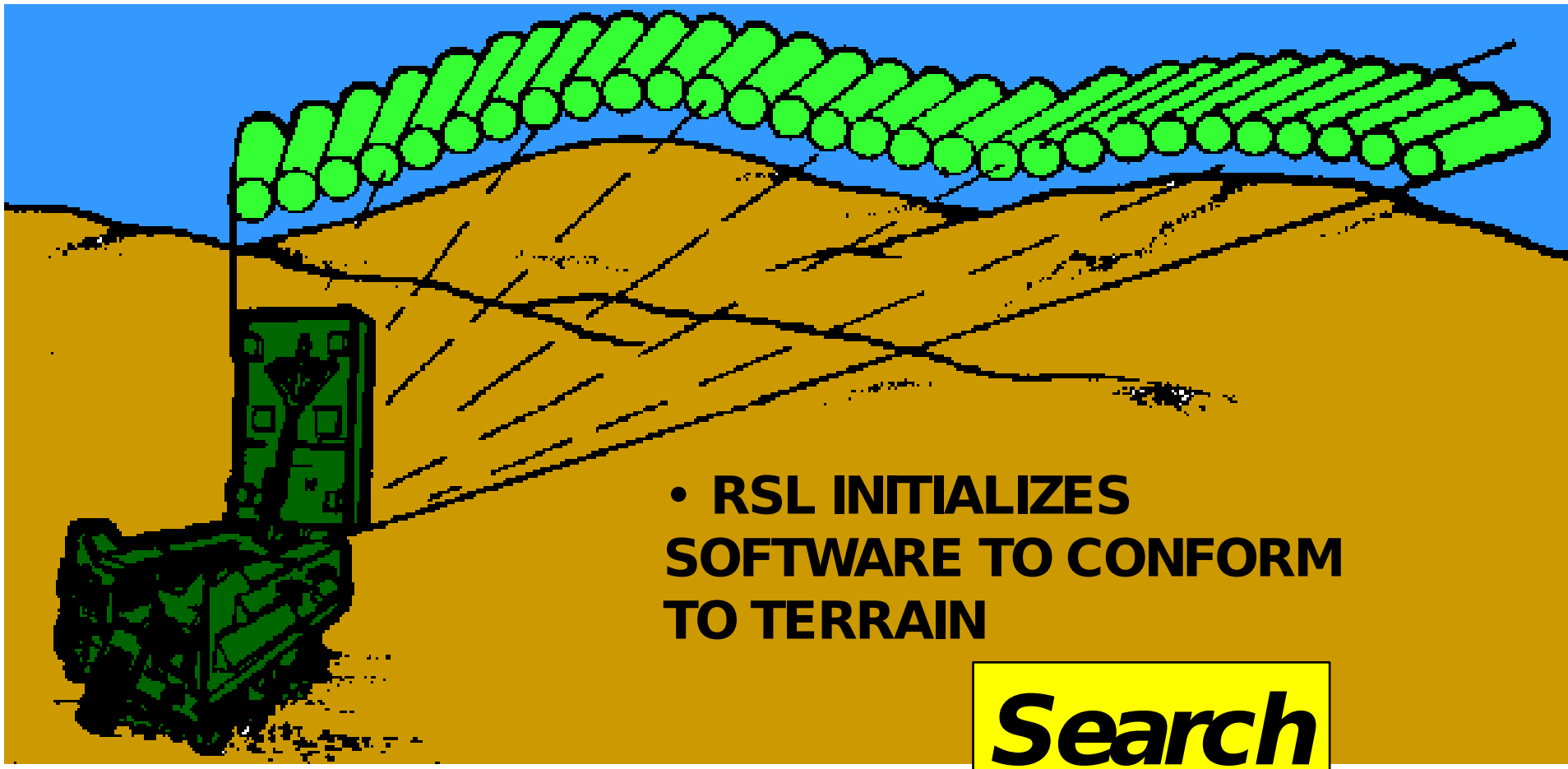


**Section must separate antenna from the trailer prior to movement. CH-47D requires assets (i.e. 8t crane) at destination for reassembling the system. The system is capable of drive-on/drive-off for C-5/C-17 transport. 101st Division aviation personnel have not verified /approved the rigging procedures for the Q-37.*

Prime Mover		**5-ton (M813) truck w/60-kw g**
Planning Ranges:		
	Artillery & Mortars	**30,000 meters**
	Rockets	**50,000 meters**
Azimuth Search Sector		**1,600 mils**
Accuracy		**100 meters CEP**
Traverse		**6,400 mils**
Elevation		**5 to 15 mils screening**
Emplacement Time		**30 minutes**
Displacement Time		**15 minutes**
Fording Capability		**30 inches**
Air Transport		
	Internal	**C-141/C-130*, C-17/C-5 configuration)**
	External	**CH-47D***
Type of Targets		**Rockets, Artillery, Mor**
Distance from FLOT		**8 to 12 kilometers**
Weight		
	Trailer	**17,780 pounds**
	Shelter	**2,780 pounds**
	W/Prime Mover	**49,500 lbs**
Length		**235in**

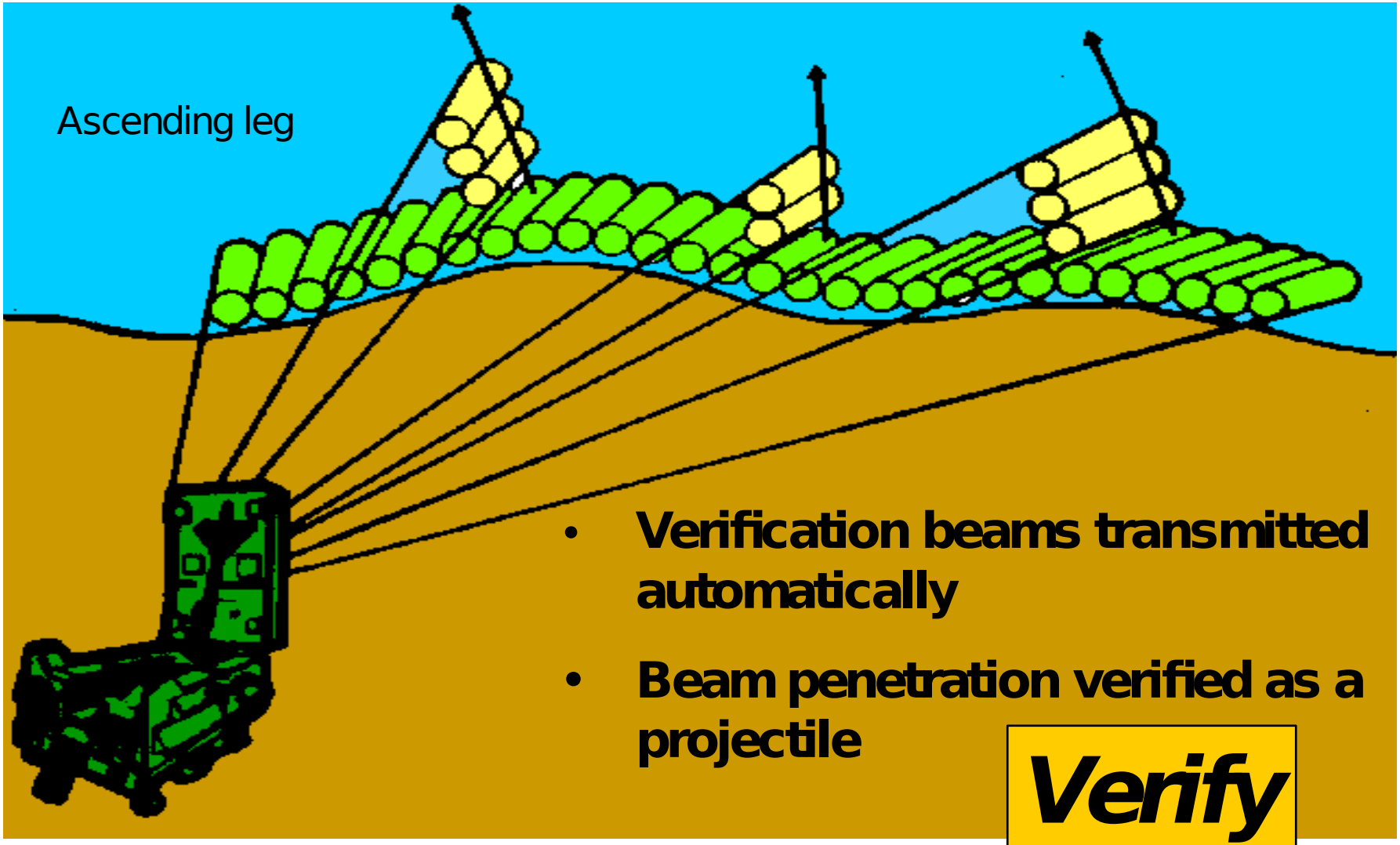
"How the Radar Works"

Search Fence Established



"How the Radar Works"

Search Fence Penetrated

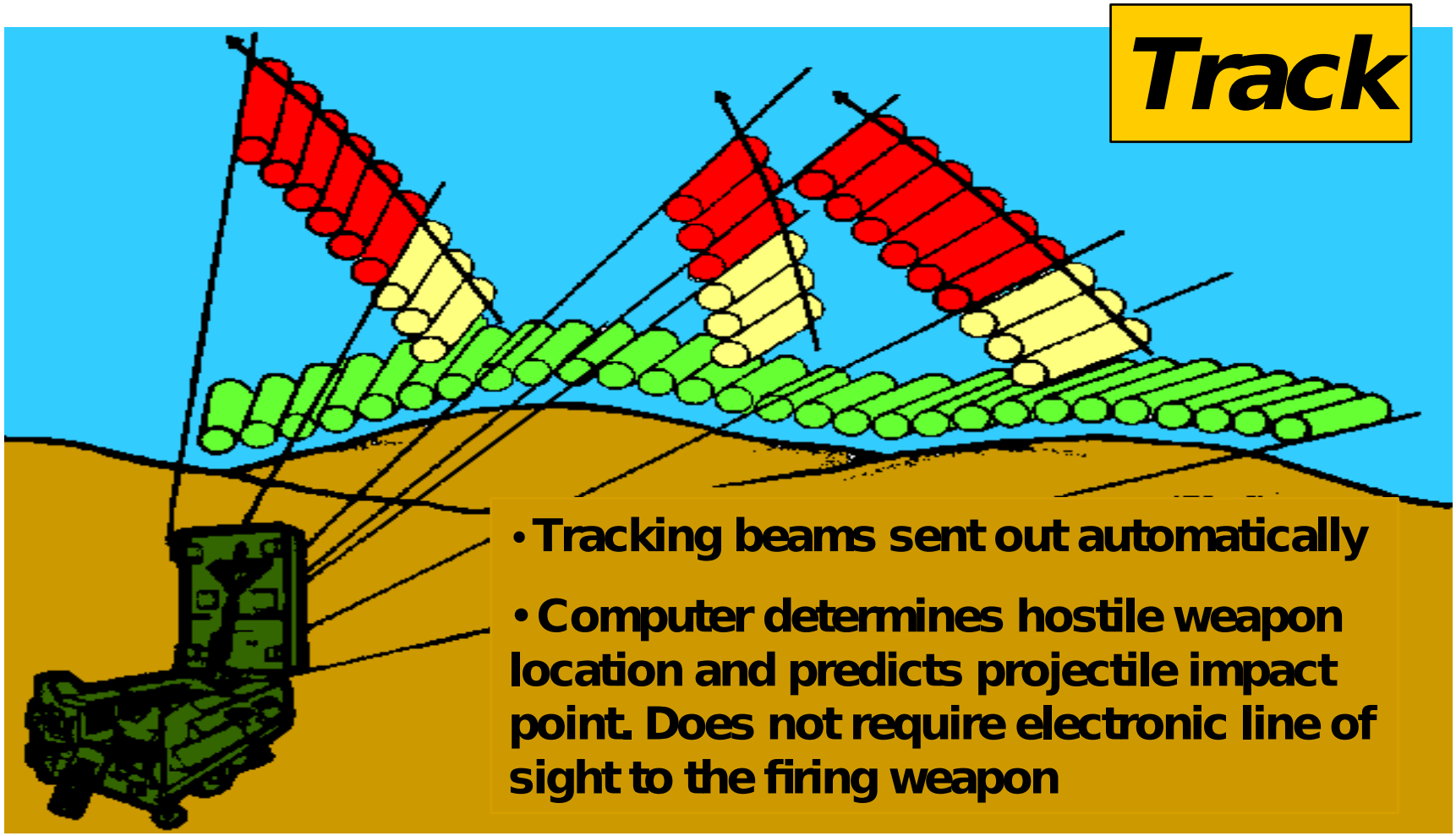


- **Verification beams transmitted automatically**
- **Beam penetration verified as a projectile**

Verify

"How the Radar Works"

Projectile Tracked


Track
• Tracking beams sent out automatically
• Computer determines hostile weapon location and predicts projectile impact point. Does not require electronic line of sight to the firing weapon

Radar Operations MDMP Based

- *Radar Deployment Order (RDO)*
- *Position Area Selection*
- *Ranges, Radar and Indirect systems*
- *Search Sectors*
- *Zones (active and on order)*
- *Common Sensor Boundary (CSB)*
- *Force protection / Logistics*

Firefinder Radar Zones

Four Types:

- ***Critical Friendly Zone; CFZ***
- ***Call for Fire Zone; CFFZ***
- ***Censor Zone; CZ***
- *Artillery Target Intelligence Zone; ATIZ*

Do not use this zone, you can only have nine active at one time and any acquisition not in the first three will automatically generate a ATIZ

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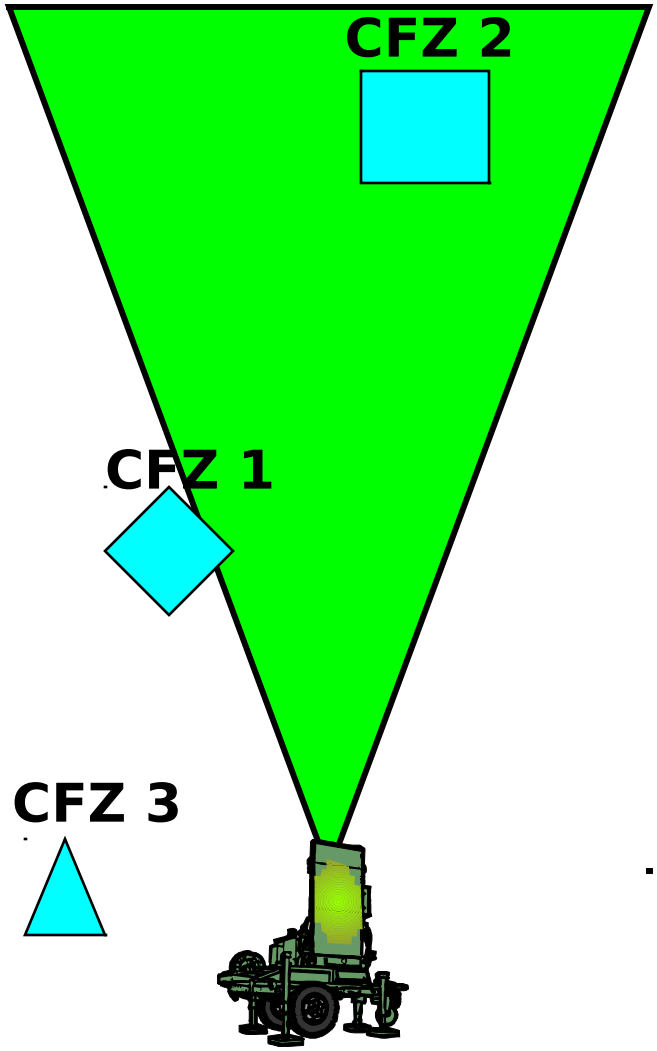
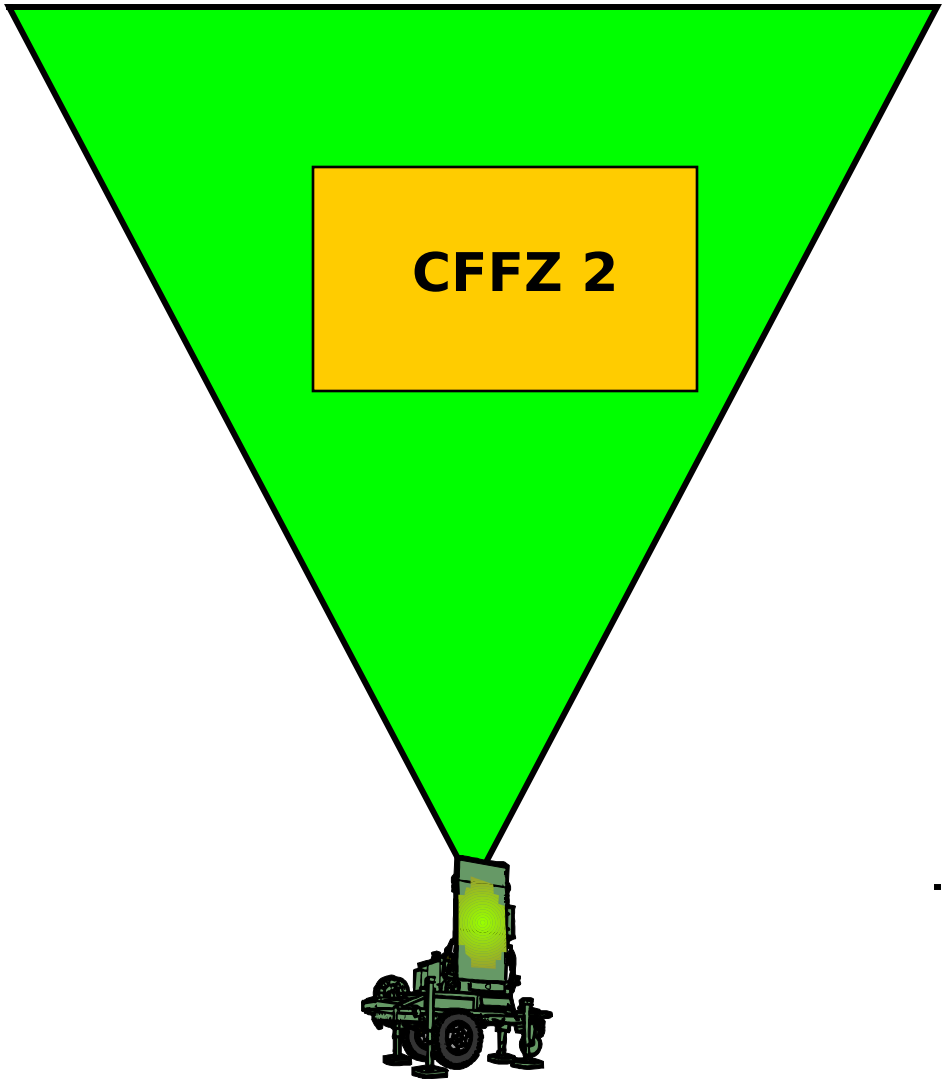
Critical Friendly Zone (CFZ)

- A friendly unit or location which the Commander designates as critical to achieving the mission. ***A round impacting in this zone will result in a priority one FM:CFF.***
- *Breach,Point of Penetration (POP).*
- *Battle Positions (BP).*
- *Support By Fire positions (SBF)*
- *LZ or DZ.*
- *May be outside of fan.*



Call for Fire Zone (CFFZ)

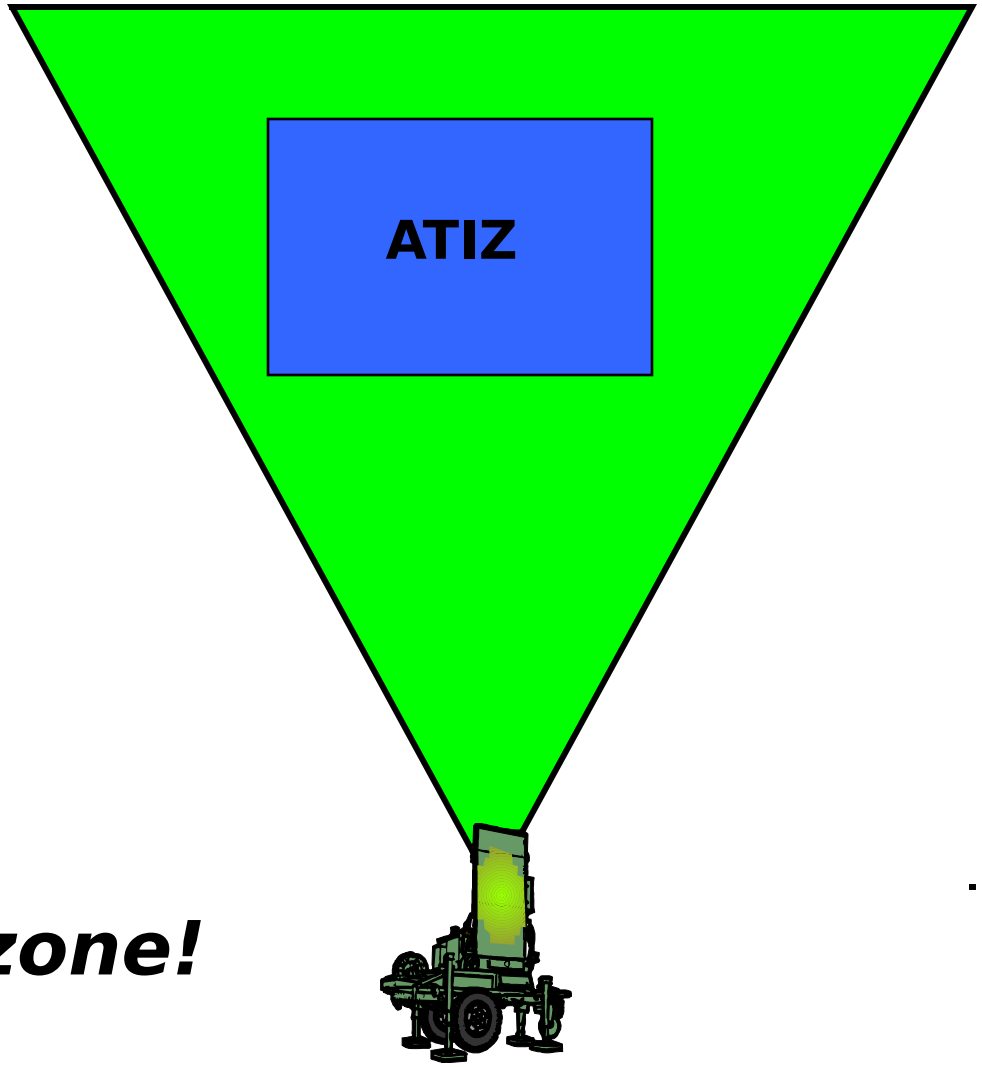
- An area forward of the FLOT that the Commander considers a priority to neutralize or suppress indirect firing systems engaging friendly forces or effecting the area of operation. ***A weapon firing from this zone will result in a FM:CFF.***
- *Must be inside fan.*



Artillery Target Intelligence Zone (ATIZ)

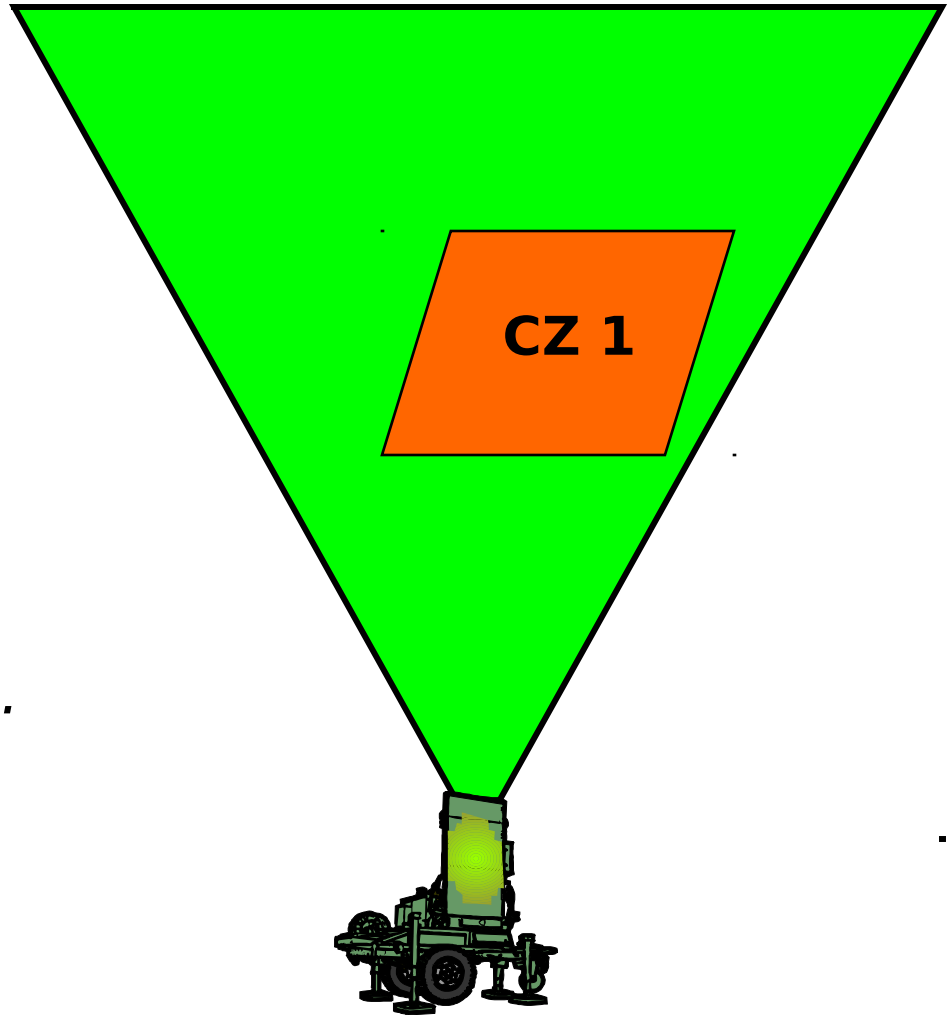
- An area in enemy territory that the Commander wishes to closely monitor. ***A weapon located in this zone will result in an ATI:CDR being generated.***

Do not use this zone!



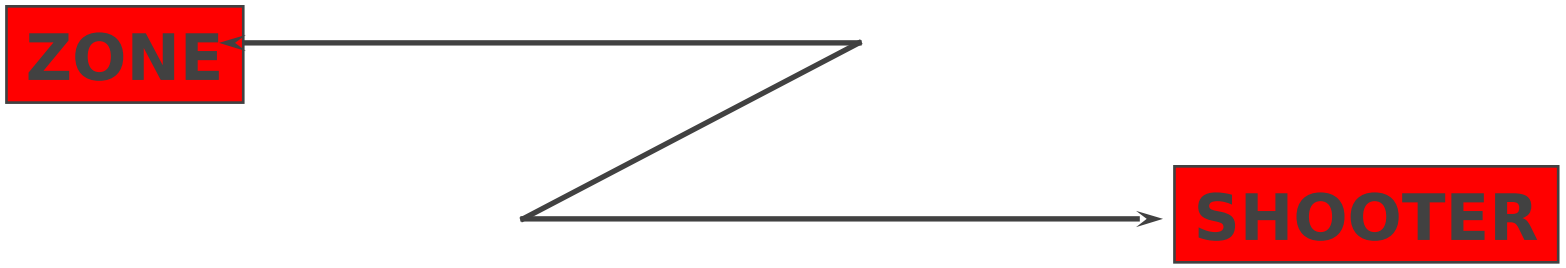
Censor Zone (CZ)

- An area that the Commander wishes to ignore all acquisitions. ***Any projectile originating from this zone will ignored by the radar.***
- *Forward Friendly Artillery/Mortar elements.*
- *Raids.*
- *Must be inside fan.*



An Effective Radar Zone

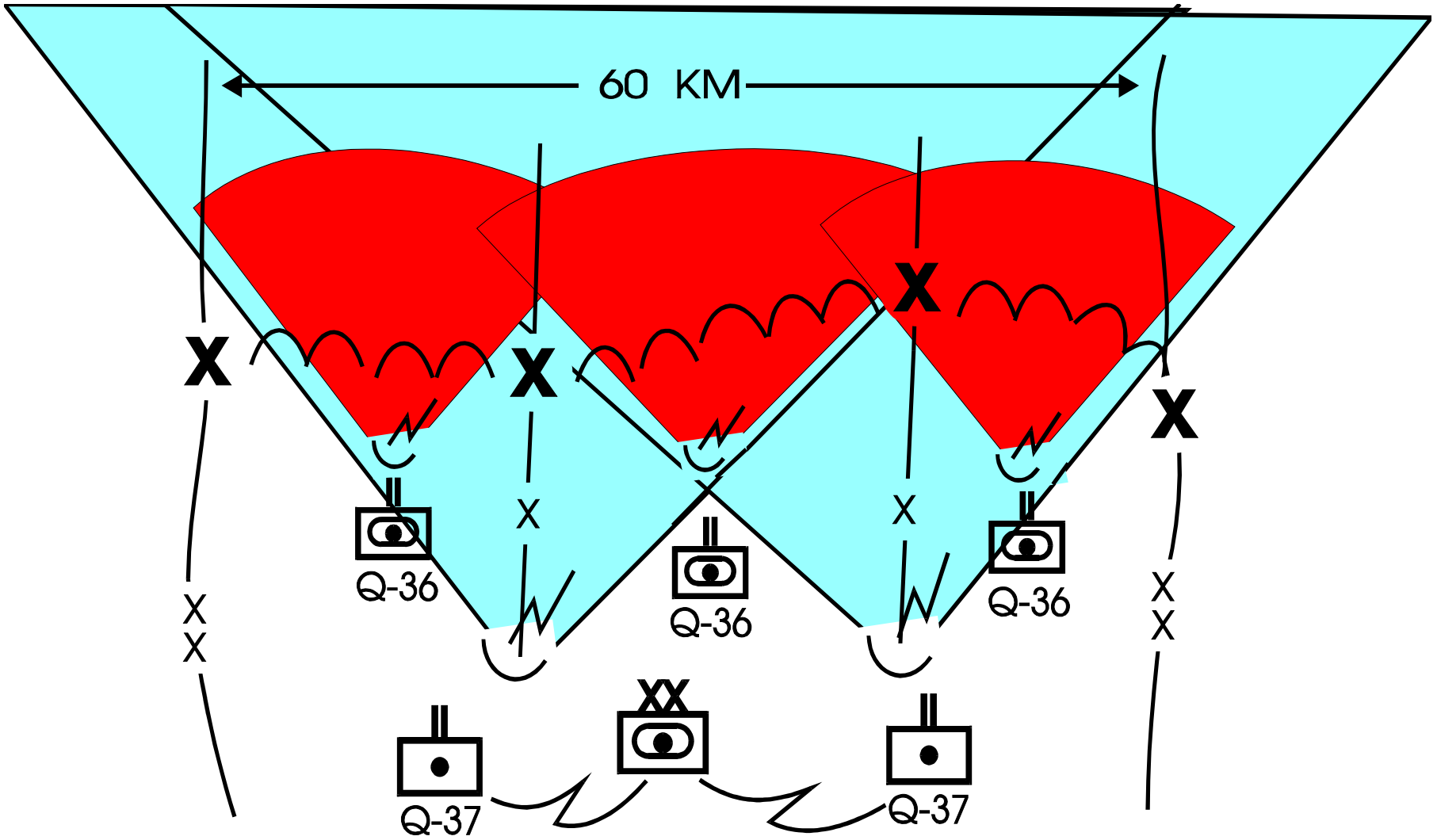
AN EFFECTIVE RADAR ZONE MUST HAVE A CLEAR PURPOSE, TRIGGER, AND SHOOTER THAT IS READY TO FIRE WITH THE CORRECT AMMUNITION, NUMBER OF ROUNDS, AND RANGE CAPABILITIES.



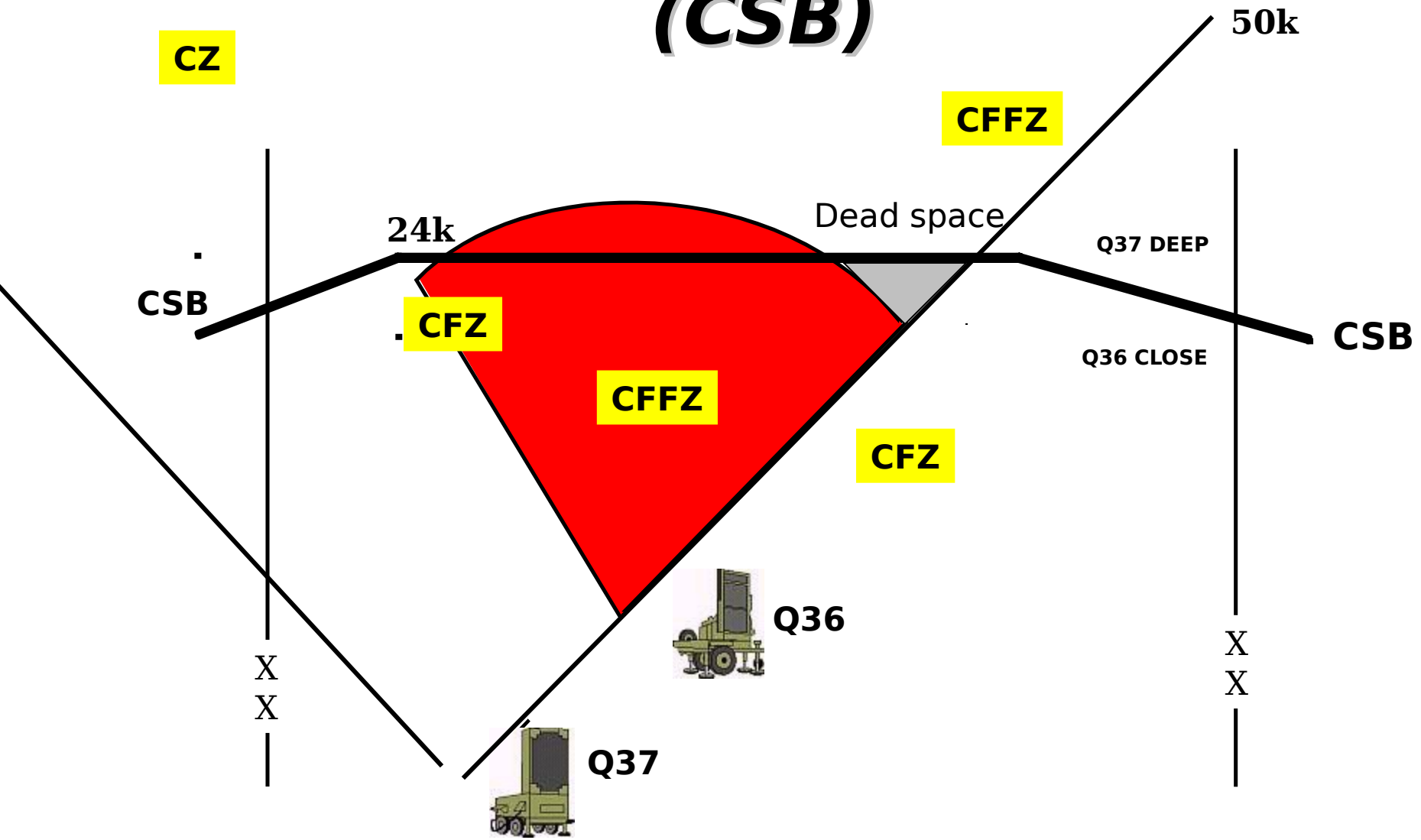
Common Sensor Boundary Employment Factors

- *Range of friendly indirect systems*
- *Effective range of target acquisition ass*
- *Reduces acquisition redundancy*
- *Reduces counterfire processing saturati*
- *Availability of ammunition*

Divisional Target Acquisition



Common Sensor Boundary (CSB)



False Targets

- Targets which are reported to the radar operator which represent electronically induced signals, either internal or external.
  - *Thermal noise or electronic interference are possible sources*.
- Side lobe tracks of radar returns that pass radar discrimination testing. ***(ex. Helicopters, Vehicles)***
- Ground clutter when the radar is used in defilade.
- Areas of ground clutter tracks can be predicted (analysis of radar positions by the RSL) and confirmed by analysis of the reported targets and through situational awareness.

Unwanted Targets

- These targets are ***other then*** mortar, artillery or rockets that are tracked with the radar's main beam energy. These targets represent "objects" that fly through the radar beam and behave in a ballistic manner; therefore, the radar often provides solutions to these tracks.
- ***Common sources of the targets are:***
  - *Tank Rounds, especially skips or ricochets, small arms and shrapnel or other material from explosions.*

Counterfire

"...fires intended to destroy or neutralize enemy weapons."

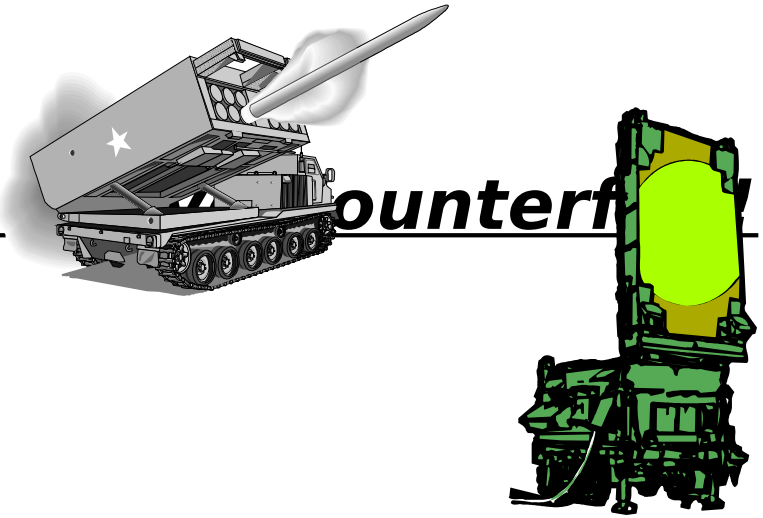
JCS Pub 1

Counterfire is both Proactive and

Reactive.

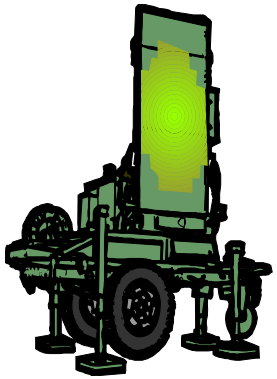
Proactive Counterfire

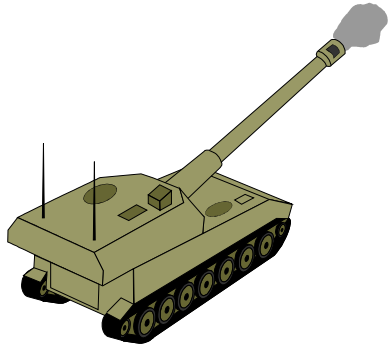
- Deep / Q-37
- Corps/Division LRS Teams
- UAV (Unmanned Aerial Vehicles)
- Intelligence Collection Assets
- Division MI Bn Assets
  - Quick Fix/SIGINT
- JSTARS
- ***Always attempt Pro[illegible]ounterf[illegible]***

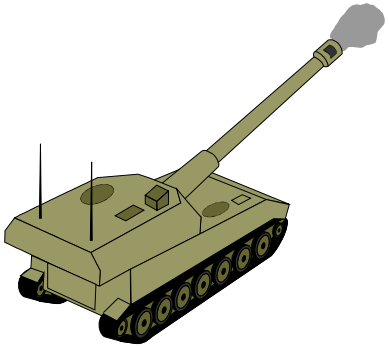


Reactive Counterfire

- *Close / Q-36*
- *Brigade COLT /FIST*
- *UAV METT-TC*
- *JSTARS METT-TC*







S2/Targeting Officer IPB Counterfire Role

- *Enemy Artillery Systems.*
- *Enemy Artillery Order of Battle.*
  - *Division / Brigade NAIs*
- *Enemy Artillery Phases of Fire*
  - *Timeline Counterfire Battle*
  - *Define CF responsibilities, Who is the Counterfire Headquarters .*

Execution of the Counterfire Fight

- *Clearance of Fires.*
- *Counterfire Battle Drill.*
- *Achieving Desired Effects.*
- *Counterfire Execution vs. Support of the Close Fight.*
- *Timeline CF Fight, integration of CF into the Scheme of Fires.*

Counterfire Battle Drill

- *Planning; Timeline and Scheme of Fires.*
- *Training; Clearly defined roles.*
- *Speed, Battle tracking and Information Flow.*
- *Clearance of Fires.*
- *Engagement of Target; Acquire to fire time, sensor to shooter link.*

TOC Organization

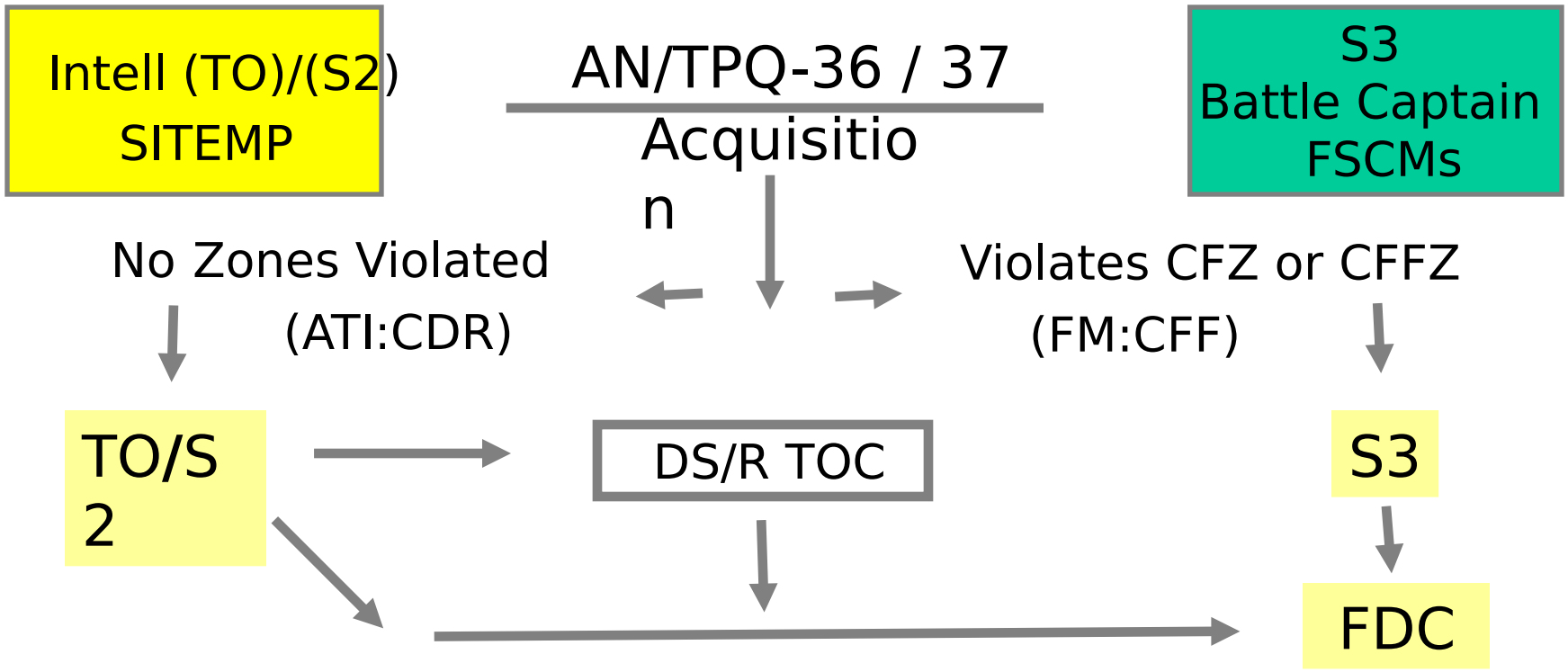
- *Information Flow / Cross Talk.*
- *Battle Tracking.*
- *Communications Capabilities.*
- *Digital Capabilities.*
- *Battle Drills.*

Counterfire Battle Drill

- *Does the acquisition violate a zone?*
  - *Zone refinement required?*
- *Do we have an impact predict grid (CFF)?*
  - *What is the (probable) effect?*
- *Is Counterfire a EFST / EFAT at this time?*
  - *What is our desired effect, (suppression, destruction).*
- *What is the enemy's phase of fire? Inform Bde S2?*
- *Battle tracking, Target Log, Information Flow.*
- *High volume fires?*

Counterfire Mission Processing

"Counterfire Battle Drill"



1. Determine Target Value.
2. Validate SITTEMP, Update IPB, zone refinement.
3. Generate Fire Mission or Pass.

1. Decide whether to Engage.
2. Compute Firing Data, Fire Mi

* Request additional fires from DS / Divarty if desired effects cannot be achieved with c assets.

SUMMARY

Counterfire and its execution is the key to providing the maneuver forces the window of opportunity